

WHAT IS CLAIMED IS:

1. A waveform equalizer comprising:  
an equalizing filter unit including a delay circuit with  
a tap;

5 a discriminator which decodes an output signal of said  
equalizing filter unit;

tap arrangement control means which controls a tap arrangement  
of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap  
10 coefficient of said equalizing filter unit, and changes the tap  
arrangement of said equalizing filter unit so as to restart a  
starting step of equalizing steps for equalizing a reception  
signal, depending upon a change state of the tap coefficient  
used while the reception signal is equalized.

15 2. A waveform equalizer equipped comprising:

an equalizing filter unit including a delay circuit with  
a tap;

a discriminator which decodes an output signal of said  
20 equalizing filter unit;

tap arrangement control means which controls a tap arrangement  
of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap  
coefficient of said equalizing filter unit, and changes the tap  
25 arrangement of said equalizing filter unit so as to restart  
reception signal equalizing steps from a preselected step prior

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to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the equalization of said reception signal.

- 5           3.    A waveform equalizer equipped comprising:  
            an equalizing filter unit including a delay circuit with  
            a tap;

            a discriminator which decodes an output signal of said  
equalizing filter unit;

- 10           tap arrangement control means which controls a tap arrangement  
of said equalizing filter unit;

- a tap coefficient monitoring unit which monitors a tap  
coefficient of said equalizing filter unit, and changes the tap  
arrangement of said equalizing filter unit so as to restart  
15   reception signal equalizing steps from a preselected step prior  
to the present step thereof while said reception signal is equalized,  
depending upon a change state of the tap coefficient during the  
equalization of said reception signal, and further so as to  
repeatedly perform said operation, depending upon a change  
20   condition of the tap coefficient while restarting the equalization  
of said reception signal.

4.    A waveform equalizer as claimed in any one of the  
preceding claims 1, 2, and 3, wherein said tap coefficient  
25   monitoring unit monitors only a specific tap, and when a sharp  
change in a tap coefficient of said specific tap is detected,

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said tap coefficient monitoring unit instructs that the tap arrangement of said equalizing filter unit is changed so as to restart the equalization of the reception signal.

5           5. A waveform equalizer as claimed in any one of the preceding claims 1, 2, and 3, wherein said tap coefficient monitoring unit monitors only a specific tap, and when dispersion of a change amount of said tap coefficient exceeds a certain threshold value, said tap coefficient monitoring unit instructs  
10 that the tap arrangement of said equalizing filter unit is changed so as to restart the equalization of the reception signal.

15           6. A waveform equalizer as claimed in any one of the preceding claims 1, 2 and 3, wherein said tap arrangement control means further comprising an impulse response predicting device for predicting an impulse response of a transfer path; and

          wherein said tap arrangement control means changes the tap arrangement of said equalizing filter unit in such a manner that said tap arrangement becomes suitable for the next impulse having  
20 a large pulse component in response to an impulse response predicted by a reference signal.

25           7. A waveform equalizer as claimed in any one of the preceding claims 1, 2 and 3, wherein said tap arrangement control means comprising an impulse response predicting device for predicting an impulse response of a transfer path; and

wherein said tap arrangement control means changes the tap arrangement of said equalizing filter unit in such a manner that said tap arrangement becomes optimum with respect to an impulse response predicted by both the equalized output of said discriminator and a condition of the reception signal.

8. A mobile station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

10 an equalizing filter unit including a delay circuit with a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

15 tap arrangement control means which controls a tap arrangement of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit, and changes the tap arrangement of said equalizing filter unit so as to restart a starting step of equalizing steps for equalizing a reception 20 signal, depending upon a change state of the tap coefficient used while the reception signal is equalized.

9. A mobile station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused 25 by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with

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a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

taparrangementcontrolmeanswhichcontrolsataparrangement  
5 of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit, and changes the tap arrangement of said equalizing filter unit so as to restart reception signal equalizing steps from a preselected step prior  
10 to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the equalization of said reception signal.

10. A mobile station wireless apparatus equipped with a  
15 waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with a tap;

a discriminator which decodes an output signal of said  
20 equalizing filter unit;

taparrangementcontrolmeanswhichcontrolsataparrangement  
of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit, and changes the tap  
25 arrangement of said equalizing filter unit so as to restart reception signal equalizing steps from a preselected step prior

to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the equalization of said reception signal; and further so as to repeatedly perform said operation, depending upon a change  
5 condition of the tap coefficient while restarting the equalization of said reception signal.

11. A mobile station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused  
10 by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

15 tap arrangement control means which controls a tap arrangement of said equalizing filter unit;

a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit; and

20 detector means which detects a moving speed of the mobile station wireless apparatus,

wherein when the moving speed is higher than a preselected threshold value, the tap arrangement of said equalizing filter unit is changed so as to restart a starting step of equalizing steps for equalizing a reception signal, depending upon a change  
25 state of the tap coefficient used while the reception signal is equalized.

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12. A mobile station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

5        an equalizing filter unit including a delay circuit with a tap;

         a discriminator which decodes an output signal of said equalizing filter unit;

         tap arrangement control means which controls a tap arrangement  
10    of said equalizing filter unit;

         a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit; and

         detector means which detects a moving speed of the mobile station wireless apparatus,

15        wherein when the moving speed is higher than a preselected threshold value, the tap arrangement of said equalizing filter unit is changed so as to restart reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized, depending upon a change  
20    state of the tap coefficient during the equalization of said reception signal.

13. A mobile station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused  
25    by frequency selective fading, said waveform equalizer comprising:

         an equalizing filter unit including a delay circuit with

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a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

tap arrangement control means which controls a tap arrangement  
5 of said equalizing filter unit;

a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit; and

detector means which detects a moving speed of the mobile station wireless apparatus,

10 wherein when the moving speed is higher than a preselected threshold value, the tap arrangement of said equalizing filter unit is changed so as to restart reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized, depending upon a change  
15 state of the tap coefficient during the equalization of said reception signal; and further so as to repeatedly perform said operation, depending upon a change condition of the tap coefficient while restarting the equalization of said reception signal.

20 14. A base station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with  
a tap;

25 a discriminator which decodes an output signal of said equalizing filter unit;



tap arrangement control means which controls a tap arrangement of said equalizing filter unit; and

5 a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit, and changes the tap arrangement of said equalizing filter unit so as to restart a starting step of equalizing steps for equalizing a reception signal, depending upon a change state of the tap coefficient used while the reception signal is equalized.

10 15. A base station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with a tap;

15 a discriminator which decodes an output signal of said equalizing filter unit;

tap arrangement control means which controls a tap arrangement of said equalizing filter unit; and

20 a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit, and changes the tap arrangement of said equalizing filter unit so as to restart reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the  
25 equalization of said reception signal.

16. A base station wireless apparatus equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with  
5 a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

tap arrangement control means which controls a tap arrangement of said equalizing filter unit; and

10 a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit, and changes the tap arrangement of said equalizing filter unit so as to restart reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized,  
15 depending upon a change state of the tap coefficient during the equalization of said reception signal; and further so as to repeatedly perform said operation, depending upon a change condition of the tap coefficient while restarting the equalization of said reception signal.

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17. A mobile communication system having a base station and a mobile station, in which at least one of said base station and said mobile station is equipped with a waveform equalizer capable of removing an adverse influence caused by frequency  
25 selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with

a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

taparrangementcontrolmeanswhichcontrolsataparrangement  
5 of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap  
coefficient of said equalizing filter unit, and changes the tap  
arrangement of said equalizing filter unit so as to restart a  
starting step of equalizing steps for equalizing a reception  
10 signal, depending upon a change state of the tap coefficient  
used while the reception signal is equalized.

18. A mobile communication system having a base station  
and a mobile station, in which at least one of said base station  
15 and said mobile station is equipped with a waveform equalizer  
capable of removing an adverse influence caused by frequency  
selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit having  
a tap;

20 a discriminator which decodes an output signal of said  
equalizing filter unit;

taparrangementcontrolmeanswhichcontrolsataparrangement  
of said equalizing filter unit; and

a tap coefficient monitoring unit which monitors a tap  
25 coefficient of said equalizing filter unit, and changes the tap  
arrangement of said equalizing filter unit so as to restart

reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the equalization of said reception signal.

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19. A mobile communication system having a base station and a mobile station, in which at least one of said base station and said mobile station is equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

10

an equalizing filter unit including a delay circuit with a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

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tap arrangement control means which controls a tap arrangement of said equalizing filter unit; and

a tap coefficient monitoring unit for monitoring a tap coefficient of said equalizing filter unit, and changes the tap arrangement of said equalizing filter unit so as to restart reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the equalization of said reception signal; and further so as to repeatedly perform said operation, depending upon a change condition of the tap coefficient while restarting the equalization of said reception signal.

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20. A mobile communication system having a base station and a mobile station, in which said mobile station is equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer comprising:

an equalizing filter unit including a delay circuit with a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

tap arrangement control means which controls a tap arrangement of said equalizing filter unit;

a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit; and

detector means which detects a moving speed of the mobile station wireless apparatus,

wherein when the moving speed is higher than a preselected threshold value, the tap arrangement of said equalizing filter unit is changed so as to restart a starting step of equalizing steps for equalizing a reception signal, depending upon a change state of the tap coefficient used while the reception signal is equalized.

21. A mobile communication system having a base station and a mobile station, in which said mobile station is equipped with a waveform equalizer capable of removing an adverse influence caused by frequency selective fading, said waveform equalizer

comprising:

an equalizing filter unit including a delay circuit with  
a tap;

5 a discriminator which decodes an output signal of said  
equalizing filter unit;

tap arrangement control means which controls a tap arrangement  
of said equalizing filter unit;

a tap coefficient monitoring unit which monitors a tap  
coefficient of said equalizing filter unit; and

10 a detector means which detects a moving speed of the mobile  
station wireless apparatus,

wherein when the moving speed is higher than a preselected  
threshold value, the tap arrangement of said equalizing filter  
unit is changed so as to restart reception signal equalizing  
15 steps from a preselected step prior to the present step thereof  
while said reception signal is equalized, depending upon a change  
state of the tap coefficient during the equalization of said  
reception signal.

20 22. A mobile communication system having a base station  
and a mobile station, in which said mobile station is equipped  
with a waveform equalizer capable of removing an adverse influence  
caused by frequency selective fading, said waveform equalizer  
comprising:

25 an equalizing filter unit including a delay circuit with  
a tap;

a discriminator which decodes an output signal of said equalizing filter unit;

tap arrangement control means which controls a tap arrangement of said equalizing filter unit;

5 a tap coefficient monitoring unit which monitors a tap coefficient of said equalizing filter unit; and

detector means which detects a moving speed of the mobile station wireless apparatus,

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10 wherein when the moving speed is higher than a preselected threshold value, the tap arrangement of said equalizing filter unit is changed so as to restart reception signal equalizing steps from a preselected step prior to the present step thereof while said reception signal is equalized, depending upon a change state of the tap coefficient during the equalization of said  
15 reception signal; and further so as to repeatedly perform said operation, depending upon a change condition of the tap coefficient while restarting the equalization of said reception signal.